60,246-141

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellant:	Otter
Serial No.:	09/930,007
Filed:	August 14, 2001
Group Art Unit:	1733
Examiner:	Piazza Corcoran, Gladys Josefina
Title:	CONDENSING HEAT EXCHANGER FORMED OF NORBORNENE POLYMER

APPEAL BRIEF

Mailstop Appeal Brief
Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Subsequent to the filing of the Notice of Appeal on February 9, 2004, Appellant hereby submits its brief. The Commissioner is authorized to charge Deposit Account No. 50-1482 in the name of Carlson, Gaskey & Olds, P.C $330.00 for the appeal brief fee. Any additional fees or credits may be charged or applied to Deposit Account No. 50-1482 in the name of Carlson, Gaskey & Olds, P.C.

REAL PARTY IN INTEREST

The real party in interest is Carrier Corporation, the assignee of the entire right and interest in this Application.

RELATED APPEALS AND INTEREERENCES

There are no related appeals or interferences.

STATUS OF CLAIMS

Claims 1, 3-6, 10, 11 and 21-27 stand finally rejected under 103(a). Claims 7-9 and 12-20 have been withdrawn from consideration.

STATUS OF AMENDMENTS

All amendments have been entered.

SUMMARY OF THE INVENTION

This invention relates to a method for making a heat transfer component. The method includes the steps of melting and hot extruding norbornene polymer to form cells of the heat transfer component. This basic structure is set forth in claims 1 and 10 (paragraphs 29 and 30 of the original specification).

Claim 4 depends on claim 1 and adds that a tube of the cell includes a plurality of grooves. (paragraph 32 of the original specification). Claim 5 depends on claim 1 and adds that the cell includes a first expanded tube including an end and a second u-shaped expanded tube including a pair of ends, and the end of the first expanded tube is located in an opening of the u-shaped second expanded tube defined between the pair of ends of the second expanded tube (paragraph 33 of the original specification). Claims 6 and 10 depend on claims 5 and 10, respectively, and add that the ends of the tubes are thermally adhered to a flange made of norbornene polymer (paragraph 34 of the original specification).

Claim 24 recites a method of making a heat exchanger including the steps of forming a plurality of cells of norbornene polymer. Each cell includes a first expanded tube including an end and a second u-shaped expanded tube including a pair of ends, and the end of the first expanded tube is located in an opening of the u-shaped second expanded tube defined between the pair of ends. The cell is used in a heat transfer component (paragraph 33 of the original specification). Claim 27 depends on claim 24 and adds that the ends of the tubes are thermally adhered to a flange made of norbornene polymer.

ISSUES

A. Are Claims 1, 3-6, 10, 11 and 21-23 properly rejected under 35 U.S.C. 103(a) based on Ripka in view of Fletcher, Winter, Ninomiya and Taga?

B. Are Claims 24-27 properly rejected under 35 U.S.C. 103(a) based on Ripka in view of Fletcher and Winter?

GROUPINGS OF CLAIMS

A. Claims 1, 3, and 21-23 stand or fall together.

B. Claim 4 stands or falls alone.

C. Claim 5 stands or falls alone.

D. Claim 6 stands or falls alone

E. Claim 10 stands or falls alone.

F. Claim 11 stands or falls alone.

G. Claims 24-26 stand or fall together.

H. Claim 27 stands or falls alone.

PATENTABILITY ARGUMENTS

A. The rejection of Claims 1, 3-6, 10, 11 and 21-23 under 35 U.S.C. 103(a) is improper.

The Examiner finally rejected Claims 1, 3-6, 10, 11 and 21-23 under §103(a) as being obvious over Ripka (U.S. Patent No. 5,038,750) in view of Fletcher (U.S. Patent No. 5,078,946), Winter (U.S. Patent No. 5,696,045), Ninomiya (U.S. Patent No. 5,525,288) and Taga (U.S. Patent No. 3,425,092).

Ripka discloses an air heating apparatus 11 including copper or aluminum tubes 201. The tubes 201 can be straight 201b or u-shaped 201a (column 6, lines 39 to 40). The pipes 201a proximate to the radiant burner 15 are u-shaped to accommodate the radiant burner 15. The Examiner states that Fletcher teaches a heat transfer component including polymer cells. Fletcher teaches an article 1 including tubes 4 having ends that are secured to end elements 2 and 3. The article 1 is injection molded as one piece. Winter generally teaches a process for preparing norbornene. The Examiner states that Ninomiya and Taga both teach extruding tubes. The Examiner contends on pages 5 and 6 of the Final Office Action that it would be obvious to one of ordinary skill in the art at the time of the invention to make the tubes of Ripka of norbornene because of Fletcher and Winter and it would be obvious to extrude the tubes because of Ninomiya and Taga. Appellant respectfully disagrees. The present invention is patentable and strikingly different from the combination of Ripka, Fletcher, Winter, Ninomiya and Taga. As described by the claims, the present invention provides a method for making a heat transfer component comprising the steps of:

...forming a plurality of cells of a norbornene polymer by melting said norbornene polymer and hot extruding said norbornene polymer to form at least one extruded tube; and

using said cells as part of said heat transfer component.

[See Claim 1]. Claims 1 and 3-27 of the present invention all share this same or similar feature. [See Claims 1 and 3-27].

Claims 1, 3-6, 10, 11 and 21-23 are not obvious in view of the combination of Ripka, Fletcher, Winter, Ninomiya and Taga. Even if the tubes 201 of Ripka were made of a norbornene polymer because of Fletcher and Winter, it would not be possible to extrude the tubes 201 because of Ninomiya and Taga. Fletcher discloses that the article 1, including the tubes 4 and the end elements 2 and 3, is manufactured as an integral unit by an injection molding process (column 4, lines 55-58). That is, the article 1 of Fletcher is formed in one piece. This is a disclosed benefit of Fletcher. Even through Ninomiya and Taga teach extruding tubes, it is not possible to extrude the tubes 4 in Fletcher because the tubes 4 and the end elements 2 and 3 are formed as an integrated unit. Extruding the tubes 4 of Fletcher would teach against the disclosed benefits. There is no suggestion to extrude the tubes in the combination of Ripka, Fletcher and Winter because Fletcher explicitly teaches against this.

Additionally, Ripka teaches that the tubes 201 are made of copper or aluminum (column 6, lines 39 to 40). Copper and aluminum are metals and a non-polymer material. Ripka only teaches the use of metal tubes 201 and teaches against using a polymer. Nothing in Ripka suggests forming the tubes 201 of an extruded norbornene polymer or any other material. Claims 2-6, 10, 11 and 21-23 are not obvious, and Appellant respectfully requests that the rejection be withdrawn.

B. The rejection of Claim 4 under 35 U.S.C. 103(a) is improper.

Claim 4 is separately contested from the rejection of claims 1, 3-6, 10, 11 and 21-23. Claim 4 recites the step of forming a plurality of grooves in the tubes with a mold having a plurality of tube mold grooves. The Examiner states that Fletcher discloses a tube 4 having external surface discontinuities, and therefore claim 4 is obvious in view of the combination of Ripka, Fletcher, Winter,

Ninomiya and Taga. Appellant respectfully disagrees. Fletcher does not disclose that the tubes 4 include grooves. Fletcher discloses that the tubes 4 can have dimples, protrusions or a roughened surface. However, Fletcher does not disclose, suggest or teach that the tubes have grooves. Therefore, the combination of these references does not teach, suggest or disclose claim 4. Claim 4 is not obvious, and Appellant respectfully requests that the rejection be withdrawn.

C. The rejection of Claim 5 under 35 U.S.C. 103(a) is improper.

Claim 5 is separately contested from the rejection of claims 1, 3-6, 10, 11 and 21-23. Claim 5 recites that a first tube has an end that is positioned in an opening between the ends of a second u-shaped tube. The Examiner states that Ripka discloses a first tube located within a pair of ends of a second tube, and therefore claim 5 is obvious. Appellant respectfully disagrees. Claim 5 is not obvious in view of the combination of Ripka, Fletcher, Winter, Ninomiya and Taga. As shown in Figure 2 of Ripka, the apparatus 11 includes straight pipes 201b and u-shaped pipes 201a. The u-shaped pipes 201a are employed to accommodate a radiant burner 15. That is, the straight pipes 201a cannot be used towards the bottom of the apparatus 11 because of the presence of the radiant burner 15. Therefore, the pipes 201a proximate to the radiant burner 15 are u-shaped to wrap around the radiant burner 15. Therefore, due to the presence of the radiant burner 15, it is not possible to position a straight pipe 201b between the opening defined by the ends of the u-shaped pipe 201a as in the claimed invention. Because it is not possible to employ this configuration in Ripka, claim 5 is not obvious and Appellant respectfully requests that the rejection be withdrawn.

D. The rejection of Claim 6 under 35 U.S.C. 103(a) is improper.

Claim 6 is separately contested from the rejection of claims 1, 3-6, 10, 11 and 21-23. Claim 6 recites that the ends of the tubes are thermally adhered to a norbornene flange. The Examiner states that Fletcher discloses that the tubes 4 are thermally adhered to the end elements 2 and 3, and therefore claim 6 is obvious. Appellant respectfully disagrees. Fletcher does not disclose, suggest or teach that the ends of the tubes 4 of Fletcher are thermally adhered to the end elements 2 and 3 of the article 1. Fletcher discloses that the article 1 is manufactured as an integral unit by injection molding. Because the article 1 of Fletcher is injection molded as a single unit, there is no reason to thermally adhere the tubes 4 to the end elements 2 and 3. That is, if the

article 1 is formed in one piece, there is nothing to adhere. None of the references, including Fletcher, disclose the step of thermally heating. Claim 6 is not obvious, and Appellant respectfully requests that the rejection be withdrawn.

E. The rejection of claim 10 under 35 U.S.C. 103(a) is improper.

Claim 10 is separately contested from the rejection of claims 1, 3-6, 10, 11 and 21-23. Claim 10 recites that a first tube has an end that is positioned in an opening between the ends of a second u-shaped tube. The Examiner states that Ripka discloses a first tube located within a pair of ends of a second tube, and therefore claim 10 is obvious. Appellant respectfully disagrees. Claim 10 is not obvious in view of the combination of Ripka, Fletcher, Winter, Ninomiya and Taga. As shown in Figure 2 of Ripka, the apparatus 11 includes straight pipes 201b and u-shaped pipes 201a. The u-shaped pipes 201a are employed to accommodate a radiant burner 15. That is, the straight pipes 201a cannot be used towards the bottom of the apparatus 11 because of the presence of the radiant burner 15. Therefore, the pipes 201a proximate to the radiant burner 15 are u-shaped to wrap around the radiant burner 15. Therefore, due to the presence of the radiant burner 15, it is not possible to position a straight pipe 201b between the opening defined by the ends of the u-shaped pipe 201a as in the claimed invention. Because it is not possible to employ this configuration in Ripka, claim 10 is not obvious and Appellant respectfully requests that the rejection be withdrawn.

Additionally, claim 10 recites the step of forming a plurality of grooves in the tubes with a mold having a plurality of tube mold grooves. The Examiner states that Fletcher discloses a tube 4 having external surface discontinuities, and therefore claim 10 is obvious in view of the combination of Ripka, Fletcher, Winter, Ninomiya and Taga. Appellant respectfully disagrees. Fletcher does not disclose that the tubes 4 include grooves. Fletcher discloses that the tubes 4 can have dimples, protrusions or a roughened surface. However, Fletcher does not disclose, suggest or teach that the tubes have grooves. Therefore, the combination of these references does not teach, suggest or disclose claim 10. Claim 10 is not obvious, and Appellant respectfully requests that the rejection be withdrawn.

F. The rejection of Claim 11 under 35 U.S.C. 103(a) is improper.

Claim 11 is separately contested from the rejection of claims 1, 3-6, 10, 11 and 21-23. Claim 11 recites that the ends of the tubes are thermally adhered to a norbornene flange. The

Examiner states that Fletcher discloses that the tubes 4 are thermally adhered to the end elements 2 and 3, and therefore claim 11 is obvious. Appellant respectfully disagrees. Fletcher does not disclose, suggest or teach that the ends of the tubes 4 of Fletcher are thermally adhered to the end elements 2 and 3 of the article 1. Fletcher discloses that the article 1 is manufactured as an integral unit by injection molding. Because the article 1 of Fletcher is injection molded as a single unit, there is no reason to thermally adhere the tubes 4 to the end elements 2 and 3. That is, if the article 1 is formed in one piece, there is nothing to adhere. None of the references, including Fletcher, disclose the step of thermally heating. Claim 11 is not obvious, and Appellant respectfully requests that the rejection be withdrawn.

G. The rejection of claims 24-27 under 35 U.S.C. 103(a) is improper.

Claims 24-27 stand rejected under 35 U.S. §103(a) as being unpatentable Ripka in view of Fletcher and Winter. Claims 24-27 recite a method of making a heat exchanger including the steps of forming a plurality of cells of norbornene polymer. Each cell includes a first expanded tube including an end and a second u-shaped expanded tube including a pair of ends, and the first expanded tube is located in an opening of the u-shaped second expanded tube defined between the pair of ends. The cell is used in a heat transfer component. The Examiner contends it would be obvious to form the heat transfer component of Ripka of norbornene because of Fletcher and Winter, and therefore Appellant's claims are obvious. Appellant respectfully disagrees.

Claims 24-27 are not obvious in view of the combination of Ripka, Fletcher, Winter, Ninomiya and Taga. As shown in Figure 2 of Ripka, the apparatus 11 includes straight pipes 201b and u-shaped pipes 201a. The u-shaped pipes 201a are employed to accommodate a radiant burner 15. That is, the straight pipes 201a cannot be used towards the bottom of the apparatus 11 because of the presence of the radiant burner 15. Therefore, the pipes 201a proximate to the radiant burner 15 are u-shaped to wrap around the radiant burner 15. Therefore, due to the presence of the radiant burner 15, it is not possible to position a straight pipe 201b between the opening defined by the ends of the u-shaped pipe 201a as in the claimed invention. Because it is not possible to employ this configuration in Ripka, claims 24-27 are not obvious and Appellant respectfully requests that the rejection be withdrawn.

H. The rejection of Claim 27 under 35 U.S.C. 103(a) is improper.

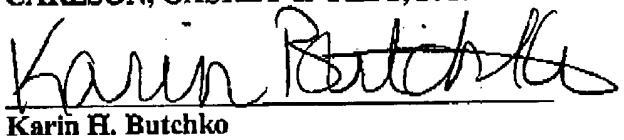
Claim 27 is separately contested from the rejection of claims 24-26. Claim 27 recites that the ends of the tubes are thermally adhered to a norbornene flange. The Examiner states that Fletcher discloses that the tubes 4 are thermally adhered to the end elements 2 and 3, and therefore claim 27 is obvious. Appellant respectfully disagrees. Fletcher does not disclose, suggest or teach that the ends of the tubes 4 of Fletcher are thermally adhered to the end elements 2 and 3 of the article 1. Fletcher discloses that the article 1 is manufactured as an integral unit by injection molding. Because the article 1 of Fletcher is injection molded as a single unit, there is no reason to thermally adhere the tubes 4 to the end elements 2 and 3. That is, if the article 1 is formed in one piece, there is nothing to adhere. None of the references, including Fletcher, disclose the step of thermally heating. Claim 27 is not obvious, and Appellant respectfully requests that the rejection be withdrawn.

CLOSING

For the reasons set forth above, the rejection of all claims is improper and should be reversed. Appellant respectfully requests such an action.

Respectfully Submitted,

CARLSON, GASKEY & OLDS, P.C.



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CERTIFICATE OF FACSIMILIE

I hereby certify that this correspondence is being facsimile transmitted to the United States Patent and Trademark Office, (703) 872-9306 on April 9, 2004.

Karin Butchko

CLAIM APPENDIX

1. A method for making a heat transfer component comprising the steps of:

forming a plurality of cells of a norbornene polymer by melting said norbornene polymer and hot extruding said norbornene polymer to form at least one extruded tube; and

using said cells as part of said heat transfer component.

3. The method as recited in claim 1 wherein the step of forming each of said plurality of cells includes extruding a first extruded tube and a second extruded tube, the method further comprising expanding said first extruded tube with air in a first mold to form a first expanded tube and expanding said second extruded tube with air in a second mold to form a substantially u-shaped second expanded tube.

4. The method as recited in claim 3 wherein said first expanded tube and said u-shaped second expanded tube include a plurality of tube grooves formed by expanding said first extruded tube and said u-shaped second extruded tube in said first mold and said second mold, respectively, each including a plurality of mold grooves on an inner surface of said first mold and said second mold.

5. The method as recited in claim 3 wherein said first expanded tube includes an end and said second expanded tube includes a pair of ends, and the method further comprises the step of attaching said end of said first expanded tube and said pair of ends of said u-shaped second expanded tube to a flange to form one of said cells, and said first expanded tube is located in an opening of said u-shaped second expanded tube that is defined between said pair of ends, and a flue gas passage containing a flue gas is defined between said first expanded tube and said u-shaped second expanded tube.

6. The method as recited in claim 5 wherein said flange is made of a norbornene polymer, and the step of attaching said end and said pair of ends to said flange includes thermally adhering said first end and said pair of ends to said flange.

7. The method as recited in claim 5 wherein said flange is made of metal, and the step of attaching said first end and said pair of ends to said flange includes heating and flaring said first end and said pair of ends.

8. The method as recited in claim 2 wherein the step of forming each of said plurality of cells includes expanding said at least one extruded tube with air in a mold to form a substantially w-shaped expanded tube and attaching a pair of ends of said expanded tube to a flange to form one of said cells, a flue gas passage being defined in said expanded tube.

9. The method as recited in claim 2 wherein said at least one extruded tube is employed in a shell and tube heat exchanger.

10. A method for making a heat transfer component comprising the step of:

melting a norbornene polymer;

hot extruding said melted norbornene polymer to form a first extruded tube and a second extruded tube;

expanding said first extruded tube with air within a first mold having a plurality of first mold grooves on an inner surface of said first mold to form a first expanded tube having a plurality of first tube grooves and expanding said second extruded tube with air within a second mold having a plurality of second mold grooves on an inner surface of said second mold to form a substantially u-shaped second expanded tube having a plurality of second tube grooves; and

attaching an end of said first expanded tube and a pair of ends of said second expanded tube to a flange to form at least one cell, and said first expanded tube is located in an opening of said second expanded tube defined between said pair of ends, and a flue gas passage containing a flue gas is defined between said first expanded tube and said second expanded tube.

11. The method as recited in claim 10 wherein said flange is made of a norbornene polymer, and the step of attaching said end and said pair of ends to said flange includes thermally adhering said end and said pair of ends to said flange.

12. The method as recited in claim 10 wherein said flange is made of metal, and the step of attaching said end and said pair of ends to said flange includes heating and flaring said end and said pair of ends.

13. A heat transfer component comprising:

at least one cell including at least one expanded tube formed of a norbornene polymer;

a flue gas passage to contain a flue gas; and

an air flow passage located between each of said at least one cell to exchange heat with flue gas flowing though said flue gas passage.

14. The heat transfer component as recited in claim 13 wherein said at least one cell includes an outer expanded tube and an inner expanded tube and said flue gas passage is located between said expanded outer tube and said expanded inner tube to contain said flue gas.

15. The heat transfer component as recited in claim 14 wherein said expanded outer tube is substantially U-shaped and includes an opening and said expanded inner tube is positioned within said opening.

16. The heat transfer component as recited in claim 14 wherein said inner expanded tube and said outer expanded tube include a plurality of grooved surfaces.

17. The heat transfer component as recited in claim 14 wherein a pair of outer ends of said outer expanded tube and an inner end of said inner expanded tube are attached to a flange.

18. The heat transfer component as recited in claim 17 wherein said flange is made of said norbornene polymer, and said inner end and said pair of outer ends are thermally adhered to said flange.

19. The heat transfer component as recited in claim 17 wherein said flange is made of metal, and said inner end and said pair of outer ends are heated and flared to attached said inner end and said outer ends to said flange.

20. The heat transfer component as recited in claim 13 wherein said at least one cell includes an expanded tube which is substantially w-shaped and forms said flue gas passage.

21. The method as recited in claim 3 wherein said first mold has a bottom portion and a top portion, the method further including the steps of positioning said first extruded tube in said bottom portion of said first mold and placing said top portion on said bottom portion to retain said first extruded tube therebetween.

22. The method as recited in claim 5 wherein said u-shaped second expanded tube is continuous between said pair of ends.

23. The method as recited in claim 10 further including a second at least one cell, and an air flow passage is defined between said at least one cell and said second at least one cell.

24. A method for making a heat transfer component comprising the steps of:

forming a plurality of cells of a norbornene polymer, each of said cells including a first expanded tube and a second u-shaped expanded tube having a pair of ends and an opening defined between said pair of ends, said second u-shaped expanded tube is continuous between said pair of ends, and said first tube is located in said opening; and

using said plurality of cells as part of said heat transfer component.

25. The method as recited in claim 24 wherein a flue gas passage is defined between said first expanded tube and said u-shaped second expanded tube.

26. The method as recited in claim 24 further comprising the step of attaching an end of said first expanded tube and said pair of ends of said u-shaped second expanded tube to a flange to form one of said plurality of cells.

27. The method as recited in claim 26 wherein said flange is made of a norbornene polymer, and the step of attaching said end and said pair of ends to said flange includes thermally adhering said first end and said pair of ends to said flange.

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